

LAND MOLLUSCA OF THE PANAMA CANAL ZONE.

BY H. A. PILSBRY.

The land shells listed below were collected by Dr. A. P. Brown during a visit to the Canal Zone in April of this year. Twenty-two species were taken, but this is probably not half of the fauna of the Zone, since other interests left but little time for collecting snails, and the condition—dense jungle with only small exposures of calcareous rock—made collecting rather slow work.

Notes on a few species from other sources are appended.

Prof. von Martens has reported 20 species of land shells from Panama, on the authority of various authors. The following species from his list are additional to those taken by Dr. Brown:

<i>Aperostoma giganteum.</i>	<i>Drymæus panamensis.</i>
<i>Helicina amæna.</i>	<i>Subulina octona.</i>
<i>Euglandina sowerbyana.</i>	<i>Leptinaria interstriata.</i>
<i>Drymæus bugabensis.</i>	" <i>McDaniella</i> " <i>fimbriata.</i>
<i>Drymæus alternans.</i>	

HELICIDÆ.

Pleurodonte (Labyrinthus) otis orthorhinus Pils. Tabernillo.

Several other races of *P. otis*, and *P. uncigera* are found on the Isthmus. See below.

Thysanophora conspurcatella (Morel.). Las Cascades.

The specimens are somewhat larger than the typical form from Mexico. Some shells of practically typical *T. conspurcatella* are in the collection of the Academy under the name *Helix panamensis* Perez. So far as I can learn no description under this name has been published. They are from the Morelet collection.

Thysanophora canalis Pils. Las Cascades.

ACHATINIDÆ.

Leptinaria lamellata concentrica Reeve. Tabernillo.

Leptinaria flocostata (Strebel) (?). Tabernillo; Las Cascades.

Leptinaria sp. undet. Las Cascades.

Leptinaria panamensis Pils. Tabernillo.

Opeas beckianum (Pfr.). Tabernillo.

Opeas pumilum (Pfr.). *O. goodalli* Mill. not Fér. Las Cascades.

Opeas panamense Pils., collected at Panama by Prof. C. B. Adams, was probably taken near the city of that name, where Adams collected marine mollusks extensively.

BULIMULIDÆ.

Bulimulus unicolor (Sowb.). Las Cascades.

Drymæus semimaculatus Pils. Tabernillo.

Drymæus near **josephus** Ang. Tabernillo.

Some other species of *Drymæus* are known from the islands in the bay of Panama.

Oxystyla princeps (Brod.). Tabernillo.

Auris distorta panamensis Pils. Between Tabernillo and San Pablo.

OLEACINIDÆ.

Euglandina cumingi (Beck). Tabernillo.

Euglandina probably **striata** (Müll.) Tabernillo. Fragments.

Salasiella browni Pils. Tabernillo; Las Cascades.

SUCCINEIDÆ.

Succinea recisa Morel. (?). Las Cascades.

Also reported by other authors.

ZONITIDÆ.

Guppya gundlachi (Pfr.). Tabernillo.

Guppya browni Pils. Between Tabernillo and San Pablo.

Ammoniceras n. sp. near **guldingi** Bld. Tabernillo.

Imperfect shells only.

PUPILLIDÆ.

Bifidaria servilis (Gld.).

Some specimens of this species from the Morelet collection are in the museum of the Academy from Panama, collected by Paz, under the name "*P. pazensis* Perez." It is probably *Pupa pazi* Hidalgo Journ. de Conchyl., 1875, p. 129. Von Martens reports *P. pellucida* in which he includes *servilis*, from Panama.

HELICINIDÆ.

Helicina funcki Pfr. Tabernillo.

Helicina lirata Pfr. Tabernillo, abundant.

Notes on New or Imperfectly Known Species.

Pleurodonte (*Labyrinthus*) *otis* (Sol.). Pl. XXXVII, figs. 5, 6, 7.

Helix otis [Solander] in Skinner & Co.'s Catalogue of the Portland Museum, 1786, p. 38, lot No. 925, based solely on Favanne, *La Conchyliologie*, pl. 63, fig. 11.

Helix labyrinthus Chemnitz, *Conchylien Cabinet*, XI (1795), p. 271, pl. 208, fig. 2048 (copied from Favanne).

The typical form of this remarkable snail is figured. It is distinguished by the strongly recurved peripheral and axial ends of the peristome and the spatulate shape of the aperture. Alt. 21, diam. 51 mm.

Isthmus of Panama. No more exact locality is known, but the form will probably be found in or near the Canal Zone. Several more or less divergent races have been described from Panama and Colombia, the status of which remains to be determined. A synopsis of these forms follows.

P. o. subplanata (Petit).

Caracolla subplanata Petit de la Saussaie, *Revue Zoologique*, Aout, 1843, p. 238 (*Nouvelle Grenade*); *Magazin de Zoologie*, 1843, *Mollusques*, pl. 68.

Smaller than *P. otis*, alt. 14, diam. 40 mm., reddish brown. Aperture as in *otis*, the peristome retracted at both ends.

This Colombian form differs from typical *P. otis* by its diminished size, but is probably not separable from the small Panamic form called *sipunculata*.

P. o. sipunculata (Forbes).

Helix labyrinthus variety *sipunculata* Forbes, *P. Z. S.*, 1850 (March 26), p. 53, pl. ix, figs. 4a, 4b (Panama).

Shell purple-brown, 35 mm. in diameter, decidedly smaller than *P. otis*; aperture as in typical *otis*, the columellar and peripheral angles of the peristome strongly recurved.

This shell does not seem to differ very materially from the earlier *subplanata* Petit. It is only provisionally admitted as a race. The figure shows the umbilicus somewhat smaller, and the aperture not exactly similar. It may, as Dr. Brown suggests to me, be a dwarfed form of *otis* owing to unfavorable station.

P. o. annulifera ('Pfr.' Reeve).

Helix annulifera Pfeiffer, *P. Z. S.*, 1851 (December 7, 1853), p. 260 (Panama) Reeve, *Conchologia Iconica*, *Helix*, pl. 100, fig. 555 (May, 1852).

The shell is much smaller than *P. otis*, alt. 13, diam. 34 mm.; deep chestnut colored with a broad white band at the acute keel. The aperture is shaped as in *P. otis*; the peristome is retracted at both ends.

This race differs from *sipunculata* only in color, which may or may not be a constant racial character.

P. o. erecta (Mouss.).

Helix erecta Mousson, malak. Blätter, xxi, 1873, p. 3. Pfeiffer, Novit. Conch., III, p. 116, pl. 127, figs. 1-3 (Bogota).

Blackish-brown, identical with *subplanata* except for its smaller size and greater elevation, alt. 13, diam. 30 mm.

P. o. orthorhinus n. subsp. Pl. XXXVII, figs. 1, 2, 3, 4.

The shell is dark brown, often blackish at the keel, and differs from *L. otis* in having the inner end of the peristome less recurved into the umbilical cavity, and the outer end much less deeply channelled, scarcely or not recurved; the gutter above the keel and the upturned flange of the latter are less emphatic.

Alt. 19, diam. 42 mm.; 5 whorls.

Types No. 101,308, A. N. S. P., from a small clearing between Tabernillo and San Pablo, on the new line of the Panama R. R., collected by Dr. Amos P. Brown, April, 1910. The same form is in the collection of the Academy from Gorgona, also on the Panama R. R. One of the specimens from Gorgona has been figured in the *Manual of Conchology*, V, pl. 64, figs. 14-16.

A specimen somewhat abnormally elevated measures alt. 23.5, diam. 45 mm.

In connection with the preceding it may be well to consider the following South American species.

Pleurodonte (Labyrinthus) plicata (Born).

Helix plicata Born, Testacea musei Cesarei Vindobonensis, 1780, p. 368 referring to Knorr, Vernügen der Augen und des Gemüths, 1771, pt. V, pl. 26, fig. 5 (India occidentalis).

Caracolla hydiana Lea, Obs. Genus Unio, ii, 1838, p. 98, pl. 23, fig. 73. (Near Puerto Cabello [Venezuela].)

This species is well distinguished from *P. otis* by its more open aperture and smaller basal teeth, as pointed out in the *Manual of Conchology*. Some specimens in the series before me agree closely with the figure referred to by Born, others with Lea's figure. It is apparently an abundant snail around Puerto Cabello, Venezuela, found also at Chorini and Caraccas, and one specimen received from Deshayes is labelled Carthagena, N. G. There is no trustworthy record of *plicata* from Panama. I cannot agree with Prof. von Martens that *plicata* and *hydiana* (*hydeana* Martens) are distinct species. A careful study of numerous specimens shows that they are identical.

A very small race, alt. 11.5, diam. 31 mm., from Marinato, Colombia, has been figured in the *Manual of Conchology* V, p. 164, pl. 63, figs. 6, 7, 8. It may be called *Pleurodonte plicata marmatensis*.

Pleurodonte (Labyrinthus) uncigera (Petit). Fig. 1.*Caracolla uncigera* Petit, Mag. de Zool., 1838, pl. 113.*Pleurodonte (Labyrinthus) tenaculum* Dall, Smiths. Misc. Coll., Vol. 52, part 3, p. 361, pl. 37, figs. 5, 6, 10, 11.

This species is well distinguished by the hook within the basal lip, projecting between two basal plicæ, though really arising from the inner part of the outer plica. Petit's very good figure of this structure is copied in my fig. 1. A whitish band revolves above, another below the peripheral keel, which is dark. Diam. 27-30 mm.

Isthmus of Panama (Pavagean, type of *uncigera*); near the Atrato River, Sierra Darien (Heighway, type of *tenaculum*).

Fig. 1.—*P. uncigera* (after Petit).Fig. 2.—*P. u. chiriquensis*.**Pleurodonte (Labyrinthus) uncigera chiriquensis** n. subsp. Fig. 2.*Helix uncigera* Pilsbry, Manual of Conchology, V, p. 164, pl. 42, figs. 23, 25, 25, 26. Not of Petit.

The shell resembles *uncigera* in shape and color, and in the form of the aperture. There are two teeth within the basal lip, the inner one small, tubercular, sometimes nearly obsolete; outer tooth entering pliciform, double, consisting of an inner fold terminating in a hook or vertical lamina, and an outer fold *superposed upon the other*, not reaching so far forward.

Alt. 12, diam. 27.5 mm.

“ 12, “ 28 “

“ 12, “ 30 “

Chiriquí, Isthmus of Panama (McNeil exped.). Type No. 5612, A. N. S. P. Also taken by Dr. W. Newcomb on the Isthmus, exact place not stated.

In this form the hook does not stand free from the entering lamina, as it does in *uncigera*. The lamina overrides the fold bearing the hook, and does not continue to or upon the peristome. In several

specimens the hook is not free but united by a thin lamina with the lip. This is the form which I described and figured as *uncigera* in the *Manual of Conchology*, Vol. V.

Thysanophora canalis n. sp. Fig. 3.

The shell is umbilicate the width of umbilicus contained $4\frac{1}{2}$ times in the diameter of the shell, which is somewhat depressed with conic spire and obtuse summit; thin; dull brown. Surface lusterless, finely striate, bearing rather closely spaced retractive delicate cuticular laminae, much more oblique than the growth-lines, usually in large part lost or wholly wanting by wear. Whorls $4\frac{3}{4}$, strongly convex, separated by deep sutures, the last rounded peripherally and beneath. Aperture much larger than the umbilicus, oblique, rotund-lunar. Peristome simple, forming about three-fourths of a circle.

Alt. 3.8, diam. 4.6 mm.

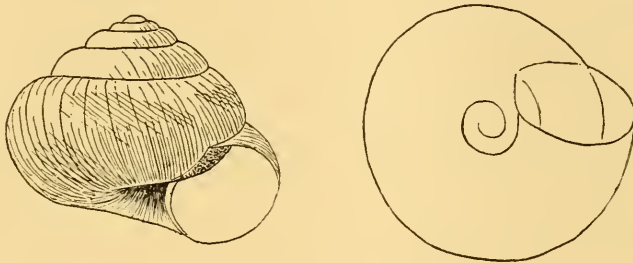


Fig. 3.—*Thysanophora canalis*.

Las Cascades, on the Panama Railroad, Canal Zone. Types No. 101,329, A. N. S. P., collected by Dr. A. P. Brown, April, 1910. This species differs from *P. conspurcatella* by its much more elevated spire and smaller umbilicus. The same species is in the collection of the Academy from Caiaca, Venezuela, collected by F. R. Cocking. These specimens are of a pale yellowish color and slightly smaller size.

Auris distorta panamensis n. sp. Pl. XXXVII, Figs. 8, 9.

This snail is closely related to *A. d. bisuturalis* Pils. from San José de Cucuta, Colombia, with which it agrees in size and general fusiform shape, in having a distinct narrow margin below the suture on the last whorl, and in style of markings. The shell, in the freshest examples, is reddish with rather widely separated, longitudinal, protractive dark streaks. It differs from *A. d. bisuturalis* by having the last whorl more compressed and tapering basally, with several short spiral furrows behind the lip, above the basal ridge; the aperture is

narrower and distinctly retracted at the base, the outer lip, in profile, curving backward there, while in *bisuturalis* it is nearly straight.

Length 41 , diam. 18.5, length aperture 22.5 mm.

"	43.5,	"	18	,	"	"	25	"	whorls	$5\frac{3}{4}$.
"	41.5,	"	18	,	"	"	23.6	"	"	$5\frac{3}{4}$.
"	42.5,	"	18	,	"	"	23.3	"	"	$5\frac{1}{2}$.

Between Tabernillo and San Pablo. Types No. 101,314, A. N. S. P., collected by Dr. A. P. Brown.

This is further northwest than any *Auris* has been found hitherto.

Leptinaria panamensis n. sp. Fig. 4.



Fig. 4.—*L. panamensis*.

The shell is narrowly perforate, turrete-conic, thin, corneous, translucent, glossy, and smooth except for very faint growth-lines. Whorls $6\frac{1}{2}$, moderately convex. Aperture ovate, subvertical, its length contained $2\frac{2}{3}$ times in that of the shell. Outer lip thin, arching forward somewhat above the middle. Columellar margin reflexed, tapering downward, armed below the middle with a strong oblique lamella.

Length 8, diam. 3.3, length of aperture 3 mm.

Between San Pablo and Tabernillo, on the new line of the Panama Railroad. Types No. 101,320, A. N. S. P.

This species is closely related to *L. mexicana* Pfr., but differs by its smooth surface.

Salasiella browni n. sp. Fig. 5.

The shell is subcylindric, the upper third tapering, thin, pale yellowish, polished, irregularly sculptured with very strongly arcuate growth wrinkles. The spire tapers slightly to the obtuse apex. Whorls $5\frac{1}{2}$, strongly convex, joined by a deep suture. Aperture very narrow in the upper half. Outer lip thin, arching very strongly forward in the middle. Columella slightly concave, truncate as usual.

Length 10.2, diam. 4, length of aperture 6 mm.

Las Cascades. Types No. 101,325, A. N. S. P. Also taken between Tabernillo and San Pablo.

The largest shell, a dead one from the last locality, measures: Length 12, diam. 4.5, aperture 7.2 mm.; whorls $5\frac{1}{2}$. Named for Dr. Amos Brown, who collected the specimens.



Fig. 5.—*S. browni*.

Guppya browni n. sp. Fig. 6.

The shell is perforate, trochiform, distinctly angular at the periphery, thin, yellowish-corneous, glossy, lightly marked with growth-lines. The outlines of the spire are nearly straight. Whorls $6\frac{1}{2}$, moderately convex, the last convex beneath, impressed around the perforation, which is half covered by the expanded columellar lip. Aperture somewhat lunate; peristome simple.

Alt. 5.3, diam. 6.5 mm.

Between Tabernillo and San Pablo, on the new line of the Panama Railway. Type No. 101,319, A. N. S. P.

This species is related to *G. selenkai* Pfr. but differs by being much larger, less glossy, with the base less convex and the peripheral angle far weaker. It is larger than any of the trochiform species known to me.

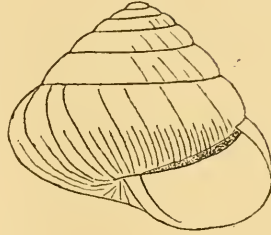


Fig. 6.—*G. browni*.

EXPLANATION OF PLATE XXXVII.

Figs. 1-4.—*Pleurodonte otis orthorhinus* n. subsp.

Figs. 5-7.—*Pleurodonte otis* (Solander). Typical form.

Figs. 8, 9.—*Aüris sinuata panamensis* n. subsp.